An Intensive Conservation Cropping System for Sustainable Cash Crop Production in the Southern USA

D. W. Reeves
USDA-ARS National Soil Dynamics Laboratory
Auburn, AL
D. P. Delaney
Auburn University Cooperative Extension Service
R. M. Durbin
Alabama Agricultural Experiment Station, Auburn University,
Auburn, AL

Abstract

Intensive cropping systems, using high-residue crops in rotations and coupled with conservation tillage, can dramatically improve soil quality and productivity. Unfortunately, economic reality often dictates cotton (*Gossypium hirsutum* L.) monoculture instead of rotations. We established a study in east-central AL to compare an intensive cropping system, maximizing the production of crop residues and legume N inputs, to standard cotton production systems used in the Southeast. The new system uses sunn hemp (*Crotalaria juncea* L.) and ultra-narrow row cotton in an intensive rotation with wheat (*Triticum aestivum* L.) and corn (*Zea mays* L.). The standard systems use continuous cotton (both standard 40-inch rows and ultra-narrow row) and a corn - cotton rotation. All systems are tested under conservation and conventional tillage. We used Auburn University Extension Budgets, adjusted for differences in actual practices that varied from inputs in the standard budgets, to calculate net returns over variable costs for the cropping and tillage systems. The intensive cropping system with conservation tillage had the second highest returns over variable costs, however, this system minimized variation in returns. Returns ranged from $58.04/A/year to $67.64/A/year with this system. Not only were net returns and risks favorable with this system, but this system returned over 6,500 lb carbon/A/year to the soil; compared to about 1,000 lb carbon/A/year for a conventional cotton production system without benefit of rotation or cover crops. Thus, this system, coupled with conservation tillage, has potential to rapidly increase soil organic matter; improving soil quality and productivity in the long term and further enhancing economic sustainability of cotton production in the Southeast.